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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/037,179	10/23/2001	Alan Gatherer	TI-31552	6358
23494	7590	11/17/2005	EXAMINER	
TEXAS INSTRUMENTS INCORPORATED			PATHAK, SUDHANSHU C	
P O BOX 655474, M/S 3999			ART UNIT	
DALLAS, TX 75265			PAPER NUMBER	
			2634	

DATE MAILED: 11/17/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

<b>Office Action Summary</b>	Application No. 10/037,179	Applicant(s) GATHERER ET AL.	
	Examiner Sudhanshu C. Pathak	Art Unit 2634	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

#### Status

- 1) ☒ Responsive to communication(s) filed on October 12<sup>th</sup>, 2005.
- 2a) ☒ This action is **FINAL**.                      2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

#### Disposition of Claims

- 4) ☒ Claim(s) 1-21 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 1-17 is/are allowed.
- 6) ☒ Claim(s) 18-21 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

#### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on March 4<sup>th</sup>, 2002 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

#### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

#### Attachment(s)

- |  |  |
|--|--|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892)   | 4) <input checked="" type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. <u>11/10/05</u> . |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)   | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)                                    |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date <u>1</u> . | 6) <input type="checkbox"/> Other: _____.  |

### **DETAILED ACTION**

1. Claims 1-to-21 are pending in the application.

#### ***Response to Arguments***

2. Applicant's arguments filed on October 12<sup>th</sup>, 2005 have been fully considered but they are not persuasive. In regards to the Arguments presented functionally there is no criticality of interleaving data bits before encoding them as is shown in (Fig. 1, elements 10, 17), or coding the data bits and interleaving the coded bits as is shown in (Fig. 2, element 21), this is a matter of design choice since the advantage of a coding gain is achieved due to coding which is performed in both instances. Furthermore, the purpose of interleaving is to avoid the effects deep fading and bursty channel noise as is further performed again in both instances and further the effects (advantages/reason) of interleaving and coding are independent of each other. Furthermore, it would have been obvious to one of ordinary skill in the art at the time of the invention that in a two antenna system as described in (Fig. 1, element 11 (transmitter side)) that moving the interleaving function after the coding convolutional would hence require only one coder in the transmitter if the coders (Fig. 1, elements 16, 17) are performing the same coding algorithmically. Therefore, the rejections regarding claims 18-21 have been maintained.

#### ***Information Disclosure Statement***

3. The information disclosure statement filed on October 12<sup>th</sup>, 2005 fails to comply with 37 CFR 1.98(a)(2), which requires a legible copy of each cited foreign patent

document; each non-patent literature publication or that portion which caused it to be listed; and all other information or that portion which caused it to be listed. A copy of the reference, listed in the IDS, "X.Li and J.A.Ritcey; Trellis Coded Modulation with Bit Interleaving and Iterative Decoding; IEEE Journal on Selected Areas in Communications, Vol. 17; Pages 715-724; 04/1999", has not been provided.

***Claim Rejections - 35 USC § 103***

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.
5. Claims 18-21 are rejected under 35 U.S.C. 103(a) as being unpatentable over the Applicant Admitted Prior Art (AAPA).

Regarding to Claims 18-20, the Applicant Admitted Prior Art (AAPA) discloses a wireless communications transmitter apparatus comprising an input for receiving a bit stream (Fig. 1, element 11 & Specification, Page 2, lines 16-21); a coder coupled to said input for performing a coding operation on said bit stream, said coder having an output for providing a result of said coding operation (Fig. 1, element 16); a first modulator coupled to said coder output for modulating said result, and a first antenna coupled to said first modulator for transmitting said modulated result on a wireless communication channel (Fig. 1, elements 11,  $\alpha$  & Specification, Page 2, lines 15-22); an interleaver coupled to said coder output for producing an interleaved

version of said result (Fig. 2, element 21); and a second modulator coupled to said interleaver for modulating said interleaved version, and a second antenna coupled to said second modulator for transmitting said modulated interleaved version on a wireless communication channel (Fig. 1 & Fig. 2). The AAPA further discloses the coder to be a convolutional coder and the first and second modulators to be QPSK modulators (Specification, Page 2, lines 15-22). Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention that the AAPA in Fig. 1 teaches a transmitter comprising a coder for coding an input bit stream, a first and second modulator for modulating the coded stream and an interleaved version of the bit stream respectively, and a first and second antenna for transmitting the respective modulated signals over a wireless communications channel. Fig. 1 teaches interleaving the input bit stream before encoding. However, the AAPA further in Fig. 2 teaches a single path transmitter wherein the function of the interleaving is performed after the encoding, therefore there is no criticality in interleaving before the encoding or after the encoding process this is a matter of design choice, thus satisfying the limitations of the claim.

***Allowable Subject Matter***

6. Claims 1-17 are allowable over the prior art of record because the cited references do not contain the specified limitation of a wireless communication receiving apparatus (method), comprising: an antenna for receiving via first and second wireless communication channels a composite communication symbol that represents first and second communication symbols which each correspond

to a result of a coding operation performed by a transmitter apparatus on a bit stream; a probability generator coupled to said antenna and responsive to said composite communication symbol for generating, for said first and second communication symbols, corresponding first and second pluralities of probabilities that the communication symbol has respective ones of a plurality of possible values of the communication symbol; a combiner coupled to said probability generator for combining said first and second pluralities of probabilities to produce a plurality of combined probabilities; a SISO decoder corresponding to said coding operation and coupled to said combiner for receiving the plurality of combined probabilities and producing therefrom a further plurality of combined probabilities; a splitter coupled between said SISO decoder and said probability generator for receiving said further pluralities of combined probabilities and producing therefrom third and fourth pluralities of probabilities that respectively correspond to said first and second communication symbols; and said probability generator operable for generating said first and second pluralities of probabilities also in response to said fourth and third pluralities of probabilities, respectively.

### ***Conclusion***

7. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within

TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

8. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Sudhanshu C. Pathak whose telephone number is (571)-272-3038. The examiner can normally be reached on M-F: 9am-6pm.

- If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Stephen Chin can be reached on (571)-272-3056
- The fax phone number for the organization where this application or proceeding is assigned is (571)-273-8300.
- Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Sudhanshu C. Pathak

  
**STEPHEN CHIN**  
**SUPERVISORY PATENT EXAMINER**  
**TECHNOLOGY CENTER 2600**